WHAT IS CLAIMED IS:

1. A beam homogenizer comprising:

an optical system for homogenizing energy distribution of a beam spot in one direction, the beam spot having a liner shape,

the optical system comprising:

an optical waveguide including a pair of reflection planes provided oppositely,

wherein the one direction is a direction of a major axis of the liner shape, and

wherein a laser beam is incident into one edge portion of the optical wave guide and emitted from the other edge portion of the optical wave guide.

2. A beam homogenizer according to claim 1, wherein the optical waveguide is a light pipe.

3. A beam homogenizer according to claim 1, wherein the beam spot has an aspect ratio of 10 or more.

4. A beam homogenizer according to claim 1, wherein the beam spot has an aspect ratio of 100 or more.

5. A beam homogenizer comprising:

an optical system for homogenizing energy distribution of a beam spot in one direction, the beam spot having a liner shape,

the optical system comprising:

an optical waveguide including a pair of reflection planes provided oppositely,

at least one cylindrical lens for expanding and projecting a plane having homogeneous energy distribution formed by the optical waveguide to the irradiated surface,

wherein the one direction is a direction of a major axis of the liner shape, and

wherein a laser beam is incident into one edge portion of the optical wave

guide and emitted from the other edge portion of the optical wave guide.

6. A beam homogenizer according to claim 1, wherein the optical waveguide is a light pipe.

7. A beam homogenizer according to claim 1, wherein the beam spot has an aspect ratio of 10 or more.

8. A beam homogenizer according to claim 1, wherein the beam spot has an aspect ratio of 100 or more.

9. A beam homogenizer comprising:

a first optical system for homogenizing energy distribution of a beam spot formed on an irradiated surface in a first direction, the first optical system comprising an optical waveguide including a pair of reflection planes provided oppositely;

a second optical system for homogenizing energy distribution of the beam spot in a second direction perpendicular to the first direction, the second optical system comprising a cylindrical lens array,

wherein the beam spot has a liner shape,

wherein the first direction is a direction of a major axis of the liner shape and the second direction is a direction of a minor axis of the liner shape, and

wherein a laser beam is incident into one edge portion of the optical wave guide and emitted from the other edge portion of the optical wave guide.

10. A beam homogenizer according to claim 9, wherein the optical waveguide is a light pipe.

11. A beam homogenizer according to claim 9, wherein the beam spot has an aspect ratio of 10 or more.

12. A beam homogenizer according to claim 9, wherein the beam spot has an aspect ratio of 100 or more.

13. A beam homogenizer comprising:

a first optical system for homogenizing energy distribution of a beam spot formed on an irradiated surface in a first direction;

a second optical system for homogenizing energy distribution of the beam spot in a second direction perpendicular to the first direction,

wherein the beam spot has a liner shape,

wherein the first direction is a direction of a major axis of the liner shape and the second direction is a direction of a minor axis of the liner shape, and

wherein each of the first optical system and the second optical system comprises an optical waveguides including a pair of reflection planes provided oppositely, and

wherein a laser beam is incident into one edge portion of the optical wave guide and emitted from the other edge portion of the optical wave guide.

14. A beam homogenizer according to claim 13, wherein the optical waveguide is a light pipe.

15. A beam homogenizer according to claim 13, wherein the beam spot has an aspect ratio of 10 or more.

16. A beam homogenizer according to claim 13, wherein the beam spot has an aspect ratio of 100 or more.

17. A laser irradiation apparatus comprising:

a laser oscillator; and

a beam homogenizer for homogenizing energy distribution of a beam spot on an irradiated surface at least in one direction, the beam spot having a rectangular shape,

wherein the one direction is a direction of a major axis of the rectangular,

wherein the beam homogenizer comprises an optical waveguide including a pair of reflection planes provided oppositely, and

wherein a laser beam is incident into one edge portion of the optical wave guide and emitted from the other edge portion of the optical wave guide.

18. A laser irradiation apparatus according to claim 17, wherein the optical waveguide is a light pipe.

19. A laser irradiation apparatus according to claim 17, wherein the laser oscillator is an excimer laser, a YAG laser, or a glass laser.

20. A laser irradiation apparatus according to claim 17, wherein the laser oscillator is a YVO_4 laser, a $GdVO_4$ laser, a YLF laser, or an Ar laser.

21. A laser irradiation apparatus according to claim 17, wherein the beam spot has an aspect ratio of 10 or more.

22. A laser irradiation apparatus according to claim 17, wherein the beam spot has an aspect ratio of 100 or more.

23. A laser oscillator comprising:

a laser oscillator, and

a beam homogenizer,

the beam homogenizer comprising:

a first optical system for homogenizing energy distribution of a beam spot on an irradiated surface in a first direction; and

a second optical system for homogenizing energy distribution of the beam spot in a second direction perpendicular to the first direction, the second optical system having a cylindrical lens array,

wherein the beam spot has a liner shape,

wherein the first direction is a direction of a major axis of the liner shape and the second direction is a direction of a minor axis of the liner shape,

wherein the first optical system comprises an optical waveguide including a pair of reflection planes provided oppositely, and

wherein a laser beam is incident into one edge portion of the first optical wave guide and emitted from the other edge portion of the first optical wave guide.

24. A laser irradiation apparatus according to claim 23, wherein the optical waveguide is a light pipe.

25. A laser irradiation apparatus according to claim 23, wherein the laser oscillator is an excimer laser, a YAG laser, or a glass laser.

26. A laser irradiation apparatus according to claim 23, wherein the laser oscillator is a YVO_4 laser, a $GdVO_4$ laser, a YLF laser, or an Ar laser.

27. A laser irradiation apparatus according to claim 23, wherein the beam spot has an aspect ratio of 10 or more.

28. A laser irradiation apparatus according to claim 23 wherein the beam spot has an aspect ratio of 100 or more.

29. A laser irradiation apparatus comprising:

a laser oscillator; and

a beam homogenizer,

the beam homogenizer comprising:

a first optical system for homogenizing energy distribution of a beam spot on an irradiated surface in a first direction; and

a second optical system for homogenizing energy distribution of the beam spot

in a second direction perpendicular to the first direction,

wherein the beam spot has a liner shape,

wherein the first direction is a direction of a major axis of the line shape and the second direction is a direction of a minor axis of the liner shape, and

wherein each of the first optical system and the second optical system comprises an optical waveguide including a pair of reflection planes provided oppositely, and

wherein a laser beam is incident into one edge portion of the first optical wave guide and emitted from the other edge portion of the first optical wave guide.

30. A laser irradiation apparatus according to claim 29, wherein the optical waveguide is a light pipe.

31. A laser irradiation apparatus according to claim 29, wherein the laser oscillator is an excimer laser, a YAG laser, or a glass laser.

32. A laser irradiation apparatus according to claim 29, wherein the laser oscillator is a YVO_4 laser, a $GdVO_4$ laser, a YLF laser, or an Ar laser.

33. A laser irradiation apparatus according to claim 29, wherein the beam spot has an aspect ratio of 10 or more.

34. A laser irradiation apparatus according to claim 29, wherein the beam spot has an aspect ratio of 100 or more.

35. A laser irradiation apparatus according to claim 29, wherein the laser irradiation apparatus comprises a moving stage for moving an irradiated surface relative to the beam spot.

36. A laser irradiation apparatus according to claim 35, wherein the laser

irradiation apparatus comprises a transferring apparatus for transferring the irradiated surface to the moving stage.

37. A method for manufacturing a semiconductor device comprising:

forming a non-single crystal semiconductor film over a substrate, and

irradiating the non-single crystal semiconductor film with a laser beam generated in a laser oscillator while moving a position of the laser beam relative to the non-single crystal semiconductor film,

wherein the laser beam is shaped into liner shape through an optical system having a cylindrical lens array and an optical waveguide,

wherein the cylindrical lens array acts upon the liner beam spot in a direction of its minor axis, and

wherein the optical waveguide acts upon the liner beam spot in a direction of its major axis.

38. A method for manufacturing a semiconductor device according to claim 37, wherein a light pipe is used as the optical waveguide.

39. A method for manufacturing a semiconductor device according to claim 37, wherein the laser oscillator is an excimer laser, a YAG laser, or a glass laser.

40. A method for manufacturing a semiconductor device according to claim 37, wherein the laser oscillator is a YVO_4 laser, a $GdVO_4$ laser, a YLF laser, or an Ar laser.

41. A method for manufacturing a semiconductor device according to claim 37, wherein the laser beam is shaped so as to have an aspect ratio of 10 or more.

42. A method for manufacturing a semiconductor device according to claim 37, wherein the laser beam is shaped so as to have an aspect ratio of 100 or more.

43. A method for manufacturing a semiconductor device comprising:

forming a non-single crystal semiconductor film over a substrate, and

irradiating the non-single crystal semiconductor film with a laser beam generated in a laser oscillator while moving a position of the beam spot relative to the non-single crystal semiconductor film,

wherein the laser beam is shaped into liner shape through an optical system comprising a cylindrical lens array and at least one optical waveguide,

wherein the optical waveguide acts upon the liner beam spot in the direction of its major axis, and

wherein the optical waveguide acts upon the liner beam spot in the direction of its minor axis.

44. A method for manufacturing a semiconductor device according to claim 43, wherein a light pipe is used as the optical waveguide.

45. A method for manufacturing a semiconductor device according to claim 43 through 20, wherein the laser oscillator is an excimer laser, a YAG laser, or a glass laser.

46. A method for manufacturing a semiconductor device according to claim 43, wherein the laser oscillator is a YVO_4 laser, a $GdVO_4$ laser, a YLF laser, or an Ar laser.

47. A method for manufacturing a semiconductor device according to claim 43, wherein the laser beam is shaped so as to have an aspect ratio of 10 or more.

48. A method for manufacturing a semiconductor device according to claim 43, wherein the laser beam is shaped so as to have an aspect ratio of 100 or more.